THE BRITISH VETERINARY JOURNAL

EDITORS:
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EDITORIAL

INTERNATIONAL COLLABORATION

We make no apology for returning to this subject. The XIVth International Veterinary Congress is over: we have met old friends and made new friends. We haye discussed common problems at meetings of sections and privately: we understand and appreciate, perhaps better than we did, the problems of animal health and disease as they apply in different parts of the world. We have listened to and debated subjects of scientific importance and interest as well as methods, based on the results of research work and experience, of controlling epizootics and diseases of a more endemic nature: we have passed resolutions bringing to the attention of governments the need for the preservation of the health of livestock and the methods which the Congress recommended for the control of diseases. There never was a time in the history of the world when is was more necessary to consider and bring into being the measures which have been recommended. The veterinary profession throughout the world has shown clearly that it is conversant with the problems, vast though they be: it asks now that the results of the work it has done, is doing, and will continue to do, should be used to the fullest extent.

Each country has its own health and disease problems to deal with and internal organisations must be responsible for schemes whereby the losses from disease within the country are reduced. There is, however, a much wider issue. Diseases, common and devastating in some countries, are completely absent from others: some diseases are not endemic in some countries but make their appearance at intervals. We plead for international effort whereby the spread of such diseases will be reduced to a minimum throughout the world. Most countries have their own regulations pertaining to disease control, some of which aim at the prevention of the introduction of exotic disease. The time is now ripe for full consideration of concerted effort throughout the world. The time has passed when it was difficult to get together representatives from different

countries: modern methods of transport have completely changed the picture. There are in existence several organisations, including Food and Agricultural Organisation (F.A.O) and the Office International des Epizooties which are eminently suitable for handling international problems relating to livestock. By working together these organisations can do much to foster international collaboration and co-operation and nothing but good can result from their efforts.

While we all appreciate to the full that the interests of our own countries demand our individual attention and that we have much to do in order radically to improve the health of our own livestock, we must also take a wider view, for so long as important epizootics are prevalent in any part of the world, our own flocks and herds are menaced. No matter what international agreements were reached, the putting of them into operation is bound to take some considerable time. There is all the more reason, therefore, why no time should be lost in getting to work on measures which can be carried out. We look to the international organisations now in being to take up seriously and quickly the whole subject of international collaboration, so that, as soon as possible, general, agreed plans can be brought into operation for the control of these major diseases in different parts of the world and consequently, a lessening of the risk of their introduction into countries which are now free. We appreciate very fully what has already been done: we ask for more and more effort.

THOUGHTS ON THE RECENT CONGRESS

By JAMES McCUNN, M.R.C.S., L.R.C.P.

JOHN GAMGEE, son of a famous father, was, in his own right, recognised to be a man of exceptional ability. Moreover, he was industrious, persistent and gifted with a vision beyond that of his contemporaries. There is no doubt that he was a genius, for he had all the attributes for such a part. He lived in a period, the glorious Victorian era, when the world, and especially his native land, was moving forward at a tumultuous pace and when, in the space of a few short years, owing to the great and rapid advancement of knowledge, man's conception of life turned in a complete revolution. In matters appertaining to the healing art, in both the medical and veterinary spheres, a great deal of the lore which had served for centuries suffered an eclipse, for this was the time which brought forth men like Lister and Pasteur. Their dramatic disclosures revolutionised medicine. Concurrently the inventive genius of the engineers, chemists and physicists had played its part. Travel and communications, and international commerce, were so facilitated that there came about a greater intermingling of men and animals than had been known in the recorded history of the world.

Young Gamgee, for he was only thirty-two years of age at the time, had the vision to recognise the implications and probable effects of all these things upon the world economy. He recognised that these advances could bring prosperity, consequent increase in population and thereby increased demand for food and especially for that of animal origin. He recognised that there was also danger, indeed peril, for the increased demand for livestock and the ease with which they could be transported from place to place might lead to the spread of contagious disease even into countries which, in previous time, had been immune from their ravages. He perceived that if these potential dangers were to be averted immediate action was required and that as a preliminary to such action it would be wise to attempt to ascertain and collate all the veterinary knowledge available at that time in order that they might know:—

1. The extent to which the different contagious diseases occurred in the various countries.

2. The directions in which contagious diseases tended to spread in each country.

3. The most successful means of treating the different contagious diseases. How could this be brought about?

Gamgee recognised that the problem went far beyond the bounds of any one country. It was a matter of international moment and so in April, 1863, he took the initiative and caused a circular letter to be issued in which he invited the teachers in the various veterinary colleges and practising veterinary surgeons from all parts of Europe to attend a congress to be held in Hamburg during the ensuing summer.

The recipients of the letter, who intended to be present at the congress, were asked to communicate with Professor Hering, Director of the Veterinary

School at Stuttgart. The congress met at Hamburg. Professor Hering was elected president and John Gamgee one of the two vice-presidents. At this meeting rinderpest, contagious pleuro-pneumonia and sheep pox came under review, and it appears that the discussions were profitable and constructive, for a series of resolutions specifying certain methods of combating these diseases was passed.

Also a list of contagious diseases which should come under legal control was compiled, a list which is very similar to the one with which we are familiar in this country at the present time.

There is no doubt that Gamgee's original brilliant idea took root, and subsequent congresses extended not only the subject matter under discussion but also the countries which took part, for until this present occasion, the fourteenth of the series, representatives gathered together in London from 53 countries, almost every part of the world being represented, and with full support of their respective governments.

Gamgee and his fellow pioneers, whilst recognising the unity of science, were fully aware of the great benefits which could accrue from the very act of bringing men of different races and outlook together even for a few days. Man cannot live on science alone and in the periods when academic affairs are temporarily brushed aside there should be opportunity for relaxation, entertainment and social intercourse. Men get to know and understand one another better in their time of leisure, and over the festive board, than they do in the more staid scientific contacts. When men become friends mistrust and schisms vanish as the morning mist and it bodes well for mankind.

These things were Gamgee's visions and we, his successors, see them brought to full fruit.

It is good that Gamgee lived long enough to see his original brilliant conception become an established fact and to receive the approbation of his fellows, for whenever veterinary surgeons of different nationalities gather together his name instinctively comes to mind, and with honour we in Britain can feel proud that he " was one of our men."

The Fourteenth International Congress

The organisers of the first international veterinary congress were enthusiasts but also they must have been good men of business, for so well did they plan that occasion that the germ of international collaboration took firm root and it has steadily and progressively flourished ever since. The thirteenth congress met in Switzerland in 1938 and almost within a year the world was plunged into chaos by the will of evil men. Eleven years passed and the permanent committee, in search of a venue, were compelled to come to London, although in the normal course of events it would have been some years before the ancient city could have the honour of again staging the event and entertaining our professional friends from overseas. This was because other European countries, not yet sufficiently recovered from the holocaust of the intervening years, felt that they could not provide such facilities as would ensure complete success.

Britain shouldered the task and with the support of the government, and a year or more of intensive work, the stage was set and success was assured. Here we must pay a tribute to Lt.-Col. J. A. Gordon Roberts, who undertook the onerous duties of organising secretary.

The place of meeting was in Westminster within the shadow of the ancient Abbey, our national shrine, which by tradition, sentiment and precept is the very heart of the British Commonwealth.

It was right, therefore, that on Sunday, August 7, the members of the conference and their friends should gather in the Abbey to ask for divine help and guidance in their deliberations during the ensuing week, deliberations which were fraught with such consequence for the welfare of mankind.

By kind permission of the Dean of the Abbey a special form of evensong was arranged. The preacher was the Rt. Rev. T. H. G. Housden, Bishop of Rockhampton, Queensland. The president and council of the R.C.V.S. attended, and representatives of the N.V.M.A. and other bodies, together with delegates of countries overseas and members of the conference, were present in such numbers that every available place was filled. And so the proceedings of this historic conference, which was held under the gracious patronage of His Majesty the King, were well and truly initiated.

On Monday, August 8, the business of the conference began and Mr. Hector McNeil, M.P., Minister of State, attended on behalf of His Majesty's Government to officially welcome the delegates and declare the conference open. He was welcomed by Sir Daniel Cabot who had just previously been unanimously elected president of the congress.

In Britain we are fortunate for on great occasions we seem to be able, as it were by instinct, to choose the right man as leader. On Monday, August 8, that intuition was correct again. Sir Daniel is by nature a modest English gentleman. Almost as soon as he rose to take command, the quiet dignity with which he conducted the proceedings and his inspiring address, left no one in doubt but that he was the right man for the job.

The main theme of the congress gravitated about world food supply, a topic which is so vitally important at the present time.

Every paper had some bearing on this problem and the first to take the stand was Lord Boyd Orr, F.R.S., probably the leading authority in the world on such matters and one who had served as first Director General of F.A.O. In the course of his address, he said that it was difficult to estimate the loss in human food-stuffs throughout the world due to preventable diseases in animals but that it must run to millions of tons per annum. If the control of animal disease could be organised on a world-wide basis there was no doubt that with our present knowledge we could enormously increase the amount of dairy and meat products available for human consumption.

Throughout the week this topic was pursued by speaker after speaker. Their addresses ranged over a very wide field geographically as well as from the point of disease. In such an account as this it would be impossible and

indeed unwise to attempt to give an account of all that took place at these meetings but we hope that on subsequent occasions we may be privileged to publish much of this valuable material in order that the knowledge therein may be made available for dissemination as widely as possible.

The N.V.M.A. Congress

As the " International " dealt primarily with the food-producing animals the N.V.M.A. arranged to hold their annual congress immediately after the International had finished, and to promote that spirit of variety which gives zest to the affairs of life; and being not unmindful of our duty as regards the welfare of the smaller animals, the theme of this congress was orientated around veterinary problems as they affect our pets and companions.

How well this idea fitted into the scheme of things was never in doubt, for the attendance, the vision and spirit of the discussions was well up to the high standard which had been set on the previous days.

The N.V.M.A. Congress culminated in a visit to the Royal Veterinary College on Monday, August 15. A full day's programme had been arranged to include papers, film shows and demonstrations. Probably the outstanding features of the International and also this Congress was the lively appreciation of the value of films as an aid to education and also the fact that the organisers in their search for speakers had cast their net wide enough to include many men from overseas.

The films were superb and it is interesting to note that the pioneer in this method of pictorial teaching was Professor Williams of Edinburgh. He made use of " moving pictures " to demonstrate the various types of lameness in horses as long ago as the year 1902.

The College was filled to capacity and as one went about amongst the people present is was impossible, if one did not consult the programme, to know if it was an " International " affair or a " National " one. This must have given Dr. Montgomerie great pleasure, for his desire had been to so merge the two congresses that they might make one complete whole. There can be no doubt that this was one of the occasions when his wishes were fulfilled.

Men cannot exist on intellectual food alone. If they try to do so they follow the fate of the insatiable cormorant which destroyed itself. The evenings of the week were, therefore, devoted to those social graces which entertain and foster good fellowship. The excellent restaurant arrangements at both venues, Westminster and Camden Town, also played their part in this respect.

Social Functions

On Monday, August 8, the president and Council of the R.C.V.S. received the members at the ancient Guildhall of the City of London. Here the delegates gained first-hand evidence of the havoc wrought by war which such conferences as this, may, we hope, serve to avert in the future. A display of historic records of the R.C.V.S. was a particularly interesting feature illustrating as they do the profession's great fight in the past for recognition and freedom.

On Tuesday delegates were entertained by His Majesty's Government.

Wednesday saw the Congress banquet and on Thursday visitors from the British Commonwealth and their ladies were entertained by the Overseas League. On Friday the N.V.M.A. were the hosts and the President, Dr. Montgomerie, received the guests at the Dorchester Hotel, Park Lane.

We hope that all our visitors will go back to their homes satisfied with the arrangements that were made to ensure that the Congress, held in bomb-scarred London and under difficult circumstances, was up to the standard that one expects of such an international gathering.

Apart from the official entertainments there were two other functions of a somewhat private nature which should be mentioned. On Tuesday the Central Veterinary Society of London entertained a number of their French colleagues to luncheon. It was a particularly happy gesture for when the Central Society was founded late in the 19th century the sponsors of that foundation took as a model the Central Society of Paris (Société Centrale Vétérinaire de Paris).

On Thursday the editors and publishers of the *British Veterinary Journal* were hosts to about 60 distinguished Commonwealth and foreign visitors at Claridge's Hotel. The Journal is the oldest veterinary periodical and it was appropriate that Dr. D. M. Campbell, who has held a veterinary editorial post for longer than any other man (43 years), except Sir John McFadyean, who reigned over the *Journal of Comparative Pathology* for ten years longer, should propose the main toast. An account of this function and the speeches made is published in this issue.

One cannot end this brief account of such a memorable week without making due note of the fact that although delegates and members of the conference came from many different countries, each with its own particular problems and outlook, the utmost amity and fraternal good will prevailed. One never heard an unkind word or saw any untoward action take place. A true spirit of one for all and all for one prevailed. Let us hope that these scientists, whose influence for good or ill is so great, will carry back to their homes the spirit of good-will, collaboration and mutual trust which was so much in evidence in London. If they do so Gamgee's dream and vision will become reality and the world can devote its energies to the arts of peace for the benefit of mankind.

THE "BRITISH VETERINARY JOURNAL" DINNER

On the occasion of the International Veterinary Congress, the Editors and Publishers (Messrs. Baillière, Tindall and Cox) of the *British Veterinary Journal* entertained a number of distinguished members of the Congress at dinner at Claridge's on August 11. The chair was taken by the Editor, Professor T. Dalling, supported by his co-Editor, Professor J. McCunn, and by Mr. R. F. West and Mr. D. H. Tindall, partners of the firm. Nearly sixty guests were present. The handsome menu card, a souvenir of the occasion, bore a reproduction of the portrait, now in the Royal College of Veterinary Surgeons, of George Fleming (1833-1901), founder and first editor of the journal.

The toast of "The *British Veterinary Journal*" was proposed by Dr. D. M. Campbell, the doyen of veterinary journalists, who has completed his forty-third year as editor of *Veterinary Medicine*—a circumstance which he attributed to no merit of his own, but to the accident of the time in which he happened to have lived. Dr. Campbell said that every profession was judged by the standard of its journalism. Its journals were the "front" which a profession showed to other professions and to the world. The streamlining of industry in America was largely due to its technical press, which kept the industry informed of what was happening, and enabled methods of manufacture to be improved and the price of products reduced. He recalled the time, about 1910, when a very large proportion of the veterinary profession in America read no professional periodical, with the result that new methods of treatment of animal diseases took years before they were widely known, whereas now, owing to the dissemination of the veterinary press, a new therapeutic measure was known to all the practitioners in the country within a few months. The periodical press was the post-graduate school in which 90 per cent of the practitioners of veterinary medicine took their courses. Naturally, they must have books as well as journals; books were essential both for the student and the practitioner, but if books only were depended upon, progress would be much slower. He strongly believed, also, in the independence of the Press. The official veterinary organs were excellent in their field, but they were limited in the things they could do—at least, that was the American experience. The *British Veterinary Journal* had been outstanding in the efforts it had made to uplift the profession and to win its recognition as a scientific profession, and for its splendid performance in the past, its usefulness in the present, and its promise for the future, he asked the company to rise and drink its health.

Professor T. Dalling, in responding, said that in travels abroad in various countries he had taken note of what scientific people in those countries read, and he had been pleased to see the place which British journals occupied in foreign libraries. There were in this country several journals devoted entirely or largely to veterinary subjects, both on the research and clinical side, and edited by members of the veterinary profession. One of them was the *British Veterinary Journal*, of which for the time being he was co-editor. They tried in that journal to strike a happy mean, and to publish articles likely to interest

veterinary surgeons in this country and throughout the world. It was its aim to deal with all matters, politics excepted, of interest to the veterinary profession. He was glad to feel that the journal was playing its part in keeping that type of work in front of the people, and he felt it a great honour to be in the succession of its line of editors. The only one of them he had known intimately was the late Sir Frederick Hobday, a hard-working and most able and disinterested man. He recalled once experiencing a tempestuous crossing of the Channel with him, and while everybody else was in some stage of distress, Hobday sat quietly writing away all the time. When asked what he was doing, he said that he was writing an editorial for the *Veterinary Journal.*

Professor J. McCunn, co-editor, who also responded to the toast, said that Professor Dalling and he had been associated for some considerable time with the *British Veterinary Journal.* They did not make a bad team. Professor Dalling was a very "high up" civil servant, and had the natural caution of his order, whereas he (Professor McCunn) had a reputation for saying what he thought at any time and to whomsoever he pleased. They reacted upon one another—"he mellows me and I ginger him." If he had been asked what had been the changes in veterinary literature in the thirty years or so of his experience, he would say that the first thing he had noticed was the great improvement in the quality of American literature. This was all the more important because so many continental sources had now dried up. The other great change was the bias towards animal husbandry. In the old days, veterinary journals were full of interesting but scrappy and individualised items, often relating to some treatment or other device, but now a much more consistent and balanced outlook on the whole subject prevailed. He held that the veterinary press, like the press in general, should be open even to the man whose views might seem ridiculous to the orthodox, provided that he had something to say, that he wrote acceptable English, and that he did not infringe the law of libel. He had the right to present his views, and to wipe him out because he was not orthodox was entirely wrong. Of how many things now established and accepted should we never have heard had the Press in former days closed its columns to all but the orthodox. Professor McCunn spoke, finally, of the extraordinarily good staff —the "back room boys"—who served the journal.

Dr. J. T. Edwards delivered himself of a very fine piece of oratory in proposing the wider toast of "Veterinary Journalism." He sketched as a background the history of veterinary science, going back to the Lyons School, and far beyond it, indeed, to the ancient world, to the early days of Rome, when the veterinarian was a highly respected individual and employed by the great patrician families. In the eastern Empire, about the fourth century, there was a very fine body of veterinarians, with a literature in epistolary form, which was collected under Constantine and later copied by another civilisation, which, imbued with the spirit of Islam, kept alive from Baghdad to Salamanca the traditions of veterinary learning, this at a time when we in the West were sunk in the Dark Ages. It might be concluded, said Dr. Edwards, that it was

the opening of the schools that brought about the foundation of veterinary journalism. That was not true. In Germany, veterinary journalism actually started before the schools, and in our own country came into existence in defiance of them. It was not the school that provided the journalism with its background, but the body of town and country practitioners, the backbone of the profession. When, in 1791, the movement came about which led to the foundation of the London School, the great John Hunter laid down a programme whereby the London School was to issue yearly transactions, but owing to the Napoleonic wars and other circumstances, the school fell on evil days. In 1828, veterinary journalism came into being with the founding of two journals; one of these exhausted itself in three years, but the other, *The Veterinarian*, did great service for nearly thirty years, and after that continued in a minor key, dying finally in 1902. The *British Veterinary Journal* was founded in 1875 and brought a new outlook to bear upon animal disease, namely, prevention. It was marked by the energetic editorship of Fleming, and of those who followed him. There had always been a veterinary tradition in this country, quite independent of the medical one, and the journal in whose name they had gathered on that occasion had taken no small part in sustaining it. He also referred to the presence of representatives of other journals, including Mr. W. Brown, Editor of the *Veterinary Record*. Veterinary science also had an interest in a number of specialist journals, such as the *Journal of Comparative Pathology*. It had been a great pleasure to be associated with this occasion, and he wished the *British Veterinary Journal* a prosperous future.

Mr. W. A. Pool, Director of the Commonwealth Bureau of Animal Health, divided the practitioners of journalism into four categories. First, the editors, who delayed manuscripts and subsequently returned them, or, if they used them, slashed out all the nice bits; secondly, authors, who submitted long, untidy papers; thirdly, printers, who were the victims of both editors and authors; and, finally, publishers, without whom all the rest could not exist. He went on to say how much he regretted some of the giants of the past, both journals and men. He regretted in particular the passing of some of the Scandinavian journals, which had lately amalgamated into one magnificent publication, but while the latter was to be welcomed, the passing of the separate journals was to be deplored. Another welcome newcomer was the *Encyclopédie Veterinaire*. He referred also to some personalities in veterinary journalism—Professor Leclainche of France, Merillat of the journal of the American Veterinary Medical Association, Adsersen of Norway, and, in this country, Dalling and others. In one survey of literature of veterinary science which his Bureau had made, they found 750,000 articles in a year, of which 10,000 were picked out as worthy of inclusion in a bibliography, and one-third of these were worthy of special emphasis in the form of a published abstract.

One subject which troubled him, Mr. Pool continued, was the availability of veterinary literature. In this country there was great difficulty in obtaining a number of veterinary journals published in certain countries, especially South

American, and, of course, from some countries of Europe at the present time no such publications came. Another difficulty was that of language. There had been a movement in recent years to increase the number of summaries of papers in other languages, and he thought such summaries might well be made longer, so as to give in other languages a more complete presentation of the paper.

Mr. R. F. West, who also responded to the toast, welcomed the guests in the name of his firm. The *British Veterinary Journal,* he said, had had a long and honourable life. It was in its 74th year. It was true that there was no particular virtue in longevity; virtue lay in continuing virility, but journals and institutions, unlike human beings, did not necessarily grow old with accumulation of years. Here he quoted from Lewis Carroll's " Father William " :—

> ". . . I argued each case with my wife,
> And the muscular strength which it gave to my jaw
> Has lasted the rest of my life."

The muscular strength of the *British Veterinary Journal* was derived from continuous argument. It was said that any journal was as good as its editor, which was perfectly true. But what made a good editor? Each editor was an entity in himself. He imprinted his personality on his journal, and made it what it was. It was fairly easy to train a man to carry out the more or less automatic functions of editorship, but that did not make a good editor. A good editor had the essential gifts of editorship inherent in him. Editorship was an unending task. Before one issue had been put to bed, another was preparing; it was a sort of permanent midwifery. The duties of an editor neither began nor finished, they continued indefinitely. The *British Veterinary Journal* had enjoyed from its editors and others very long spells of service. He himself, in his capacity as a member of the publishing firm concerned, had been associated with it for twenty-nine years. It had been a pleasure to serve the veterinary profession in this way, and his recollections were all of the happiest.

Something had been said that evening about publishers As one concerned with veterinary publications, two things stuck out in his memory. One was in 1930, during the national slump of that time, when everybody was " drawing in." It was at that time of all others that, on the suggestion of Sir Frederick Hobday, the third volume of the *History of Veterinary Literature* was published as a supplement to the *Veterinary Journal,* and the words which Sir Frederick wrote in the journal at that time in appreciation of the action of the publishers would always be cherished by them. Another occasion which warmed the publishers' hearts, and which he hoped he might be forgiven for mentioning, was when an author, whose book his firm had published, came, and said : " When I was a veterinary student my great ambition was to write a book and have it published by Baillière, Tindall and Cox. That ambition has been realised, and I am a proud man to-day."

Mr. West finally paid a tribute to Mr. Eley, most of whose work had

been done behind the scenes, and to other colleagues engaged on the production of the journal. Saying that he supposed there was no time in which veterinary journalism was more useful than to-day, he called upon the company once more to drink to "Veterinary Journalism. May it flourish root and branch and live for ever!"

The proceedings concluded with a few words by Professor G. H. Wooldridge, thanking the hosts for their hospitality.

THE COMPANY

Those present at the dinner were:—

Hosts

Professor T. Dalling, M.A., M.R.C.V.S., F.R.S.E., President, Royal College of Veterinary Surgeons; Chief Veterinary Officer, Ministry of Agriculture and Fisheries; Editor, *British Veterinary Journal.*

Professor J. McCunn, M.R.C.V.S., M.R.C.S., L.R.C.P., Professor of Anatomy and Biology, Royal Veterinary College, London; Editor, *British Veterinary Journal.*

Mr. R. F. West, M.C., B.A. Partner, Baillière, Tindall & Co.

Mr. D. H. Tindall, B.A., Partner, Baillière, Tindall & Cox.

Guests

Professor E. C. Amoroso, M.D., D.Sc., Ph.D., B.Ch., B.A.O., Professor of Physiology, Royal Veterinary College, London.

Professor W. I. B. Beveridge, M.A., D.V.Sc., Professor of Animal Pathology, University of Cambridge.

Professor F. Blakemore, M.R.C.V.S., D.V.S.M., Professor of Veterinary Medicine, University of Bristol.

Dr. W. P. Blount, Ph.D., F.R.C.V.S., F.R.S.E., Veterinary Adviser, British Oil and Cake Mills, London.

Professor T. J. Bosworth, M.A., B.Sc., M.R.C.V.S., D.V.S.M., Professor of Pathology, Royal Veterinary College, London.

Mr. W. Brown, M.R.C.V.S., Editor, The *Veterinary Record,* London.

Mr. H. E. Bywater, M.R.C.V.S., Examiner in Veterinary Medicine, Royal College of Veterinary Surgeons; Treasurer, National Veterinary Medical Association, London.

Sir Daniel Cabot, M.R.C.V.S., President, International Veterinary Congress.

Dr. D. M. Campbell, Editor of *Veterinary Medicine,* Chicago, U.S.A.

Dr. L. Q. de Vries, The Hague, Holland.

Dr. T. M. Doyle, F.R.C.V.S., D.V.S.M., Veterinary Laboratory, Ministry of Agriculture and Fisheries, Weybridge, England.

Dr. A. M. Diesel, M.R.C.V.S., Deputy Director, Field Administration, Onderstepoort Laboratory, South Africa.

Dr. J. T. Edwards, D.Sc., M.R.C.V.S., Research Institute, Pirbright, Surrey, England.

Professor Dr. G. Flückiger, Director, Veterinary Office of the Federal Department, Berne, Switzerland.

Professor A. A. Forsyth, M.R.C.V.S., D.V.S.M., Principal, Glasgow Veterinary College.

Professor C. Formston, F.R.C.V.S., Professor of Surgery, Royal Veterinary College, London.

Professor R. E. Glover, M.A., B.Sc., F.R.C.V.S., Professor of Veterinary Pathology, University of Liverpool.

Dr. L. B. A. Grace, M.R.C.V.S., D.V.S.M., Chief Technical Adviser on Meat Inspection, Ministry of Food, London.

Dr. J. Russell Greig, C.B.E., Ph.D., M.R.C.V.S., F.R.S.E., Director, Animal Diseases Research Association, Edinburgh.

Dean W. A. Hagan, D.V.M., M.S., D.Sc., Dean of the New York State Veterinary College, Cornell University, U.S.A.

Dr. C. S. M. Hopkirk, D.V.Sc., Veterinary Adviser to the Government of New Zealand.

Mr. H. J. Johns, C.B., M.B.E., Under Secretary, Ministry of Agriculture and Fisheries.

Major W. Hamilton Kirk, M.R.C.V.S., London.

Dr. K. V. L. Kesteven, D.V.Sc., Veterinary Adviser, Food and Agricultural Organisation, Washington, U.S.A.

Dr. H. G. Lamont, D.Sc., M.R.C.V.S., Head of Veterinary Research Division, Ministry of Agriculture, N. Ireland.

Dr. J. H. Mason, D.Sc., F.R.C.V.S., F.R.S.E., Director, South African Institute for Medical Research, Johannesburg, South Africa.

Dr. C. A. Mitchell, B.V.Sc., D.V.M., F.R.S.C., Dominion Animal Pathologist, Animal Diseases Research Institute, Hull, Canada.

Professor W. M. Mitchell, M.C., T.D., M.B., Ch.B., B.Sc., M.R.C.V.S., Principal, Royal (Dick) Veterinary College, Edinburgh.

Dr. R. F. Montgomerie, B.Sc., Ph.D., F.R.C.V.S., Director of Veterinary Research, Wellcome Physiological Research Laboratories, Beckenham, Kent; President, National Veterinary Medical Association.

Mr. A. Messervey, M.R.C.V.S., Jersey, Examiner in Veterinary Surgery for the Royal College of Veterinary Surgeons.

Dr. W. M. McKay, Ph.D., M.R.C.V.S., Veterinary Adviser, Iodine Educational Bureau, London.

Mr. W. G. R. Oates, Solicitor of the Supreme Court, Secretary and Registrar, Royal College of Veterinary Surgeons.

Dr. H. Plum, V.D.M., State Veterinary Serum Institute, Copenhagen.

Mr. W. A. Pool, M.R.C.V.S., Director, Commonwealth Bureau of Animal Health, Weybridge, England.

Dr. J. I. Quin, Deputy Director, Research Section, Onderstepoort Laboratory, South Africa.

Professor G. Ramon, Director, Office International des Epizooties, Paris.

Dr. J. N. Ritchie, B.Sc., M.R.C.V.S., D.V.S.M., Deputy Chief Veterinary Officer, Ministry of Agriculture and Fisheries.

Lt.-Col. J. A. Gordon-Roberts, Organising Secretary, International Veterinary Congress.

Professor N. J. Scorgie, M.A., B.Sc., M.R.C.V.S., Professor of Animal Husbandry, Royal Veterinary College, London.

Dr. W. Scott, Dr.Med.Vet., F.R.C.V.S., Bridgwater, Somerset, England.

Dr. B. T. Simms, D.V.M., Chief Veterinary Officer, Bureau of Animal Industry, Washington, U.S.A.

Mr. R. J. Simmons, C.B.E., M.R.C.V.S., Adviser on Animal Health, Colonial Office, London

Professor Dr. Lars Slagsvold, Chief Veterinary Officer, Oslo, Norway.

Mr. H. Thornton, B.V.Sc., M.R.C.V.S., D.V.H., F.R.S.I., Chief Veterinary Inspector, Newcastle upon Tyne.

Professor J. Verge, National Veterinary College, Alfort, Paris.

Dr. S. H. Whitworth, Dr.Med.Vet., B.V.Sc., M.R.C.V.S., Veterinary Adviser to the Government of Canada, London.

Professor G. H. Wooldridge, F.R.C.V.S., M.R.I.A., Emeritus Professor of Medicine, Royal Veterinary College, London.

Dr. W. R. Wooldridge, Ph.D., M.Sc., M.R.C.V.S., Scientific Director, Animal Health Trust, London.

Mr. P. R. West, Staff, Baillière, Tindall and Cox.

Mr. H. W. Eley, Staff, Baillière, Tindall and Cox.

PROFESSOR GASTON RAMON

Director of l'Office International des épizooties

By G. FLUCKIGER,

Berne.

At the meeting of l'Office International des Epizooties, in May, 1949, the delegates of the participating countries unanimously appointed as Director of the office, Professor Ramon, Member of the Institute and Honorary Director of the Pasteur Institute, in succession to Professor Leclainche, who was made the Honorary Director.

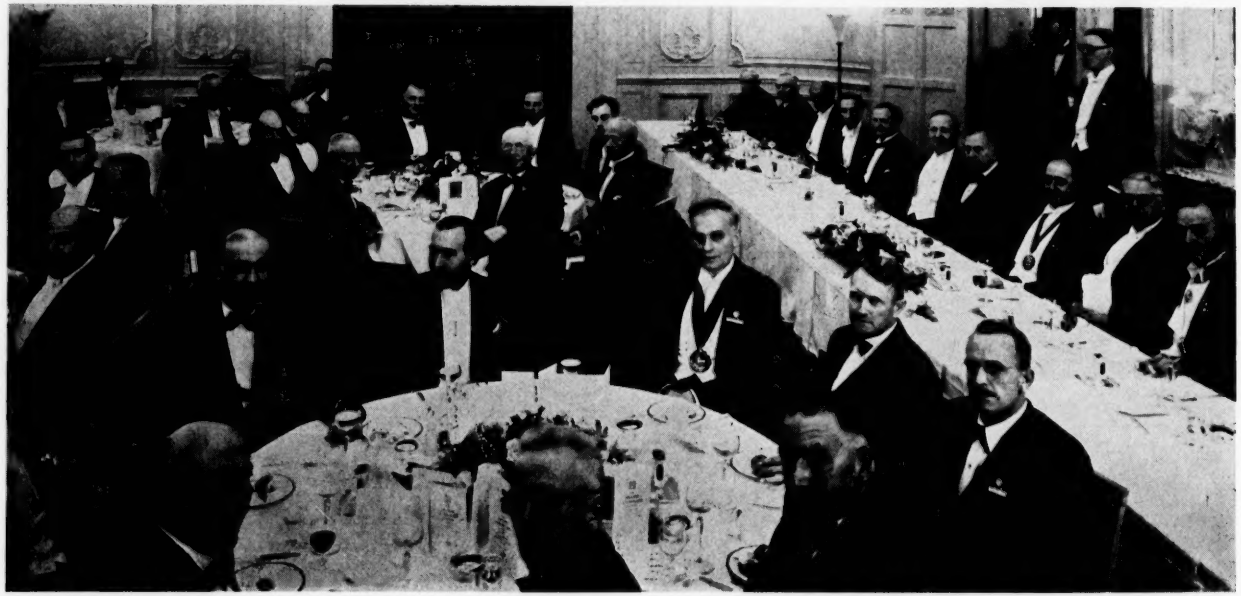
Ramon was born on September 30, 1886, in the small village of Bourgogne, and, following a sound education at Lyceé de Sens (in the Department of l'Yonne), he entered the Alfort Veterinary School, where he obtained his veterinary diploma in 1910.

During the four years at Alfort he became interested in laboratory work, first in chemistry and later in infectious diseases, which were being studied by Edmond Nocard and Henri Vallée: this experience laid the foundations for the work which Ramon eventually pursued.

He has never had special courses of instruction in microbiology or in immunology, theoretical or practical, nor has he had any hospital experience.

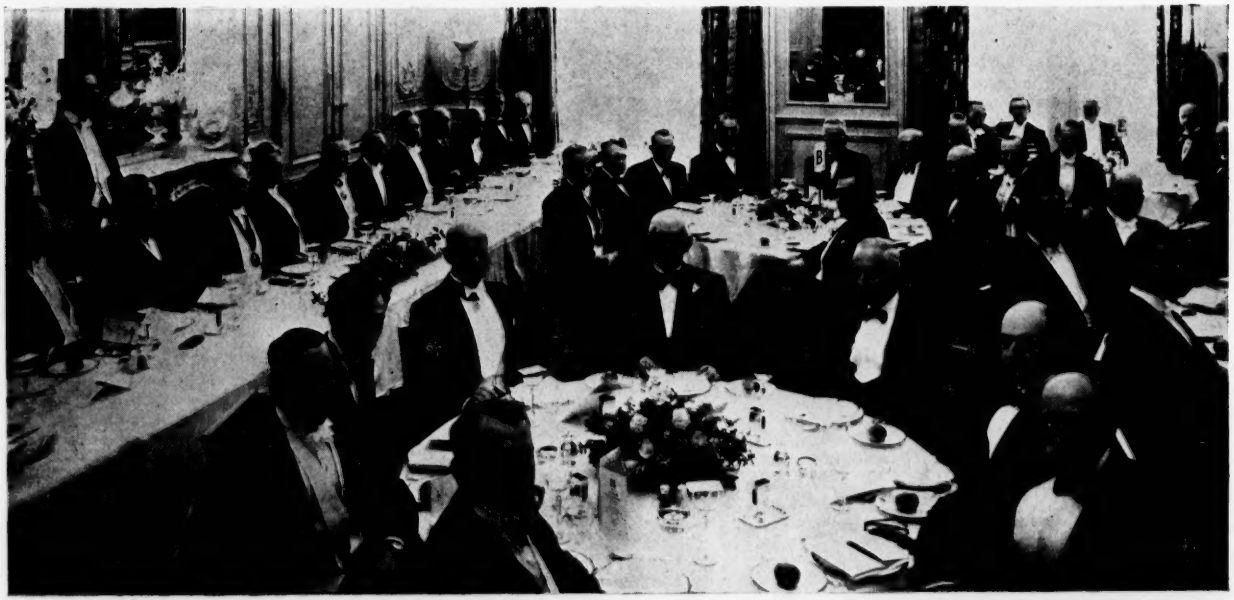
On the following two pages are to be found photographs taken at the *British Veterinary Journal* Dinner held at Claridge's Hotel, London, on Thursday, August 11, 1949.

The "British Veterinary Journal" Dinner



At the high table (reading from left to right): Professor G. Ramon; Professor Dr. G. Flückiger; Dr. H. Plum; Mr. D. H. Tindall; Mr. W. A. Pool; Professor J. McCunn; Dr. D. M. Campbell; Professor T. Dalling; Professor Dr. Lars Slagsvold; Dr. J. T. Edwards.

XIVth International Veterinary Congress



At the high table (reading from left to right): Professor J. McCunn; Dr. D. M. Campbell; Professor T. Dalling; Professor Dr. Lars Slagsvold; Dr. J. T. Edwards; Mr. R. F. West; Dean W. A. Hagan; Professor J. Verge; Dr. J. Russell Greig; Dr. L. Q. de Vries; Sir Daniel Cabot.

His training has been purely veterinary: his experiences at Alfort are responsible for the development of his powers of observation, and they engendered in him the liking for experimentation.

Some months after leaving Alfort (1910), he was introduced by Henri Vallée to M. Roux, of the Maison de Pasteur, who was prepared to accept him there. Because of his veterinary work, he was allotted to the "Service of the Production of Serums" at Garches, not only to carry out experimental work, but also because he had the desire and ambition to undertake duties of a practical nature.

During the years 1911 to 1920, and particularly during the first world war, his work was confined to the immunisation and hyperimmunisation of thousands of horses and the production of tens of thousands of litres of anti-serums (tetanus, diphtheria, dysentery, etc.). From these experiences he was able to make many observations which he used later in his experimental work.

From 1915, he was fortunate in being able to observe the fundamental studies of M. Roux in Yersin in diphtheria and diphtheria toxin (1888), the memorable trials with anti-diphtheria sero-therapy, his work with Vaillard, with Borrel on tetanus, etc. He was able to collect many suggestions and bits of advice, which he kept in mind in the hope that he would ultimately be able to use them.

At the same time he became well acquainted with the immortal works of Pasteur, and with publications of celebrated veterinarians, such as Chauveau, Toussaint, Galtier, Henri Bouley, Nocard, Leclainche, etc.

Suggestions and advice from M. Roux and scientific lectures added to the knowledge he had acquired by his own efforts at Garches during his leisure time.

So, in 1920, he was ready to embark upon experimental work: at that time he had only a small laboratory without any material or equipment, other than some test tubes and pipettes.

Ramon's experimental work is based on three principal discoveries made between 1922 and 1925.

(1) *The floculation phenomenon* found when bacterial toxins are mixed with their respective antitoxins.

(2) *The principles of anatoxins and anatoxin immunisation.*

(3) *The principle of stimulating immunity by the use of adjuvants.*

(1) *The floculation phenomenon,* which Ramon demonstrated in 1922, enabled him to establish later the titration *in vitro* of bacterial toxins (modified or not) with antisera, e.g., antidiphtheria and antitetanus.

The floculation method has come rapidly into general use in immunological work and has become most useful. It is employed universally in experimental work as well as in practice, particularly in the estimation of the amount of antitoxin in antitoxin sera and of the antigenic value of toxins and anatoxins.

(2) It was from his work on the floculation phenomenon that Ramon

discovered the principles of anatoxins. In 1923, in a note to the Académie Sciences de Paris, presented in his name by Emil Roux, he showed that a diphtheria toxin from which the toxicity had been completely removed, by the combined influence of formalin and heat, but which still floculated in the presence of diphtheria antitoxin, had undergone little alteration so far as the power to produce immunity of high order was concerned. He proved that this " anatoxin " could be used in the hyperimmunisation of animals. Also, because of its lack of toxicity and its high immunising value, it appeared to be suitable for use in children.

In the same note Ramon showed that similar results were obtained with tetanus toxin in the production of *tetanus anatoxin*.

In 1924 in another communication to the Académie des Sciences he showed that poisons of animal origin, e.g., venoms, toxic vegetable albumens such as ricin and abrin could be treated in a manner similar to the toxins of micro-organisms so as to render them non-toxic but still antigenic: they were thus transformed into anavenins, anaricine, etc.

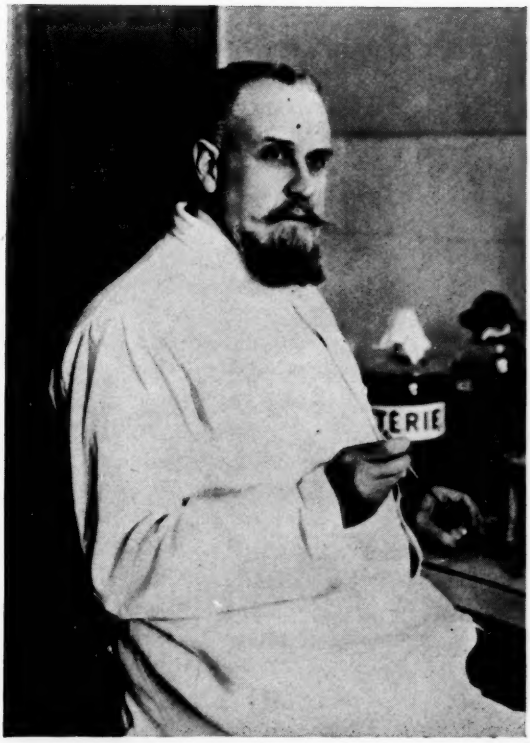
By a similar technique he prepared the following anatoxins—gas gangrene, botulinus, dysentery, staphylococcus, bacillus of Preisz-Nocard, etc.

(3) In 1925, Ramon reported in two communications to the Académie de France that the injection of a mixture of an inert substance like tapioca and diphtheria or tetanus anatoxin into horses produced immunity and that the antitoxins so elaborated were of much higher value than those obtained by the use of the anatoxins alone. This led to the *principle of adjuvant substances which stimulate immunity* which has been of much practical value in vaccination.

From his work on anatoxins Ramon has established methods of immunisation of which the following are the most important:—

Antidiphtheria vaccination which has extended rapidly throughout the world. The first results having been conclusive and confirmed by the International Conference in London (1931) diphtheria anatoxin vaccination became general. It became obligatory in France, Hungary, Rumania, several Swiss cantons, U.S.S.R., Egypt, Spain, Italy, Norway, the Argentine Republic and Japan. In other countries, notably Germany, Great Britain, Belgium, Denmark, Sweden, Jugo-Slavia, U.S.A., Canada, etc., it was recommended by the health authorities and was systematically practised.

Wherever antidiphtheria vaccination has been properly put into operation the result has been a considerable decrease in the morbidity and mortality among vaccinated persons, the incidence becoming almost none. Thus, in New York, where a large proportion of children have been vaccinated since 1932 the annual rate of mortality from diphtheria per 100,000 children under 15 years of age was 86.4 for the period 1910-19 and 42.2 until 1929 when it fell abruptly because of vaccination to 6.3 in 1934 and 0.4 in 1944. Further, in New York before 1920 about 15,000 cases of diphtheria with 1,300 deaths occurred annually while in 1948 there were reported only 150 cases and 6 deaths. In Scotland 700,000 children were vaccinated in 1941-42, i.e., about 65 per cent of the child popula-



Professor Ramon

tion: during these two years 794 deaths occurred among non-vaccinated and only 13 among vaccinated children. Similar types of results were obtained in other countries, e.g., Canada, France, Denmark, etc.

Antitetanus vaccination was first carried out successfully in the cavalry of the French Army (from 1929). It was made compulsory for all French troops in 1936. Just before the Second World War anti-tetanus vaccination was practised in the British and Canadian armies and then it became compulsory in the American Army. It can be said that to-day, because of the use of tetanus anatoxin, tetanus has practically disappeared in the Allied armies: in all about a dozen cases occurred in the American Army, of which six were in vaccinated personnel. All writers concur on the merits of this method of vaccination and agree that it was the best discovery in preventive medicine in the war.

Other vaccinations (anatoxin), e.g., antityphoid, anti-whooping cough which were first used in France, are now being used in different parts of the world, especially in America.

Staphylococcus anatoxin therapy is largely employed in man and animals in the treatment of external affections due to staphylococci.

The original research work of Ramon and its results concerning the principles of anatoxins in immunity, gave at once an impetus both in France and abroad to a very large amount of study on the simultaneous action of formalin and heat on a variety of antigens. The principle of transforming toxins into anatoxins should be capable of application, by analogy, for the production of anatoxic and anavirulent vaccine, etc., and of virus-vaccine of the jennerian and pasteurian types which are still living but in which the virulence is attenuated.

Thus there were prepared and used anatoxic vaccines against blackquarter in cattle, against certain forms of gas gangrene as well as typical and atypical anendotoxins, anavaccines against whooping cough, against cholera, against brucellosis of animals, against anthrax, against swine erysipelas, etc.

Specific prophylaxis against different diseases due to viruses should be possible according to the principles of anatoxins and antivirulent vaccines. New inactivated vaccines for some virus diseases are already available.

The anavirulent rabies vaccine used in Algeria, Japan, etc., for the prevention of rabies in dogs and for the treatment of the disease in man in different countries following the bite from a rabid animal is taking the place of the Pasteur virus-vaccine.

Anti-foot and mouth disease vaccine (Schmidt-Waldmann), vaccines against meningo-encephalomyelitis of horses, vaccines against rinderpest and against swine fever, vaccines against epidemic typhus, etc., are examples.

Research work has been carried out in America and elsewhere for some years on the application of anavirulent vaccines in immunisation against influenza, mumps, poliomyelitis, etc. Ramon himself carried out work on an anti-variola vaccine with a view to eliminating the occurrence of encephalitis

which sometimes occurs after vaccination against small pox by the Jenner method.

To summarise, because of the economic importance of the use of such vaccines in the protection of domestic animals, especially livestock, against fatal diseases (tetanus, blackquarter, gas gangrene, etc.), and against epizootics (foot and mouth disease, rinderpest, encephalomyelitis, etc.), the method of immunisation based on the principle of anatoxins and anavirulent vaccines which differ essentially from the method of Jenner and Pasteur, has been considerably extended and is used in the prophylaxis against many infections in man and in treatment in some cases (diphtheria, tetanus, botulism, staphylococcus infection, typhus, influenza, etc.). The use of such vaccines during the past twenty years has saved human lives and prevented illness and is doing so to-day. It can be estimated that several hundred million individuals have been protected throughout the world following the work of Ramon.

During more recent times, in spite of difficulties of all kinds, Ramon has continued his research work, studying, for example, ferments, anaferments and anti-ferments. Recently he has carried out work on microbial antagonism, particularly what he has called the antagonistic complexes.

Ramon has published up to date more than 600 notes, memoires and scientific articles: this gives an idea of his activity. He founded the "Revue d'Immunologie" and directed it for 15 years.

After having been "chef de laboratoire," "chef de service," "sous-directeur" and then "directeur" of the Pasteur Institute, Ramon now has the title of "Directeur Honoriare de l'Institut Pasteur."

He is a member of the Institute (Académie des Sciences), of the Académie de Médicine, of the Académie de Chirurgie, and of the Académie Vétérinaire de France. He is also a member of numerous foreign "Academies" or "Sociétiés Savantes" and is a Doctor "Honoris Causa" of many foreign universities.

To conclude: the work of G. Ramon, remarkable for its scientific importance, its originality, its continuity and its volume, carried out during the past 25 years is especially humanitarian: by providing new methods of the prevention of, and fight against, infectious diseases, affecting both human beings and animals, a great contribution has been made to the well-being of mankind.

Such is the veterinary "savant" who has just been appointed Director of the "Office international des epizooties." We give him our warm congratulations and wish him every success in his new duties.

GENERAL ARTICLES

AN ESTIMATE OF THE QUARTERLY CALVING RATE OF HEIFERS IN WELSH COUNTIES and the percentage annual replacements in the Principality

Part I.—Calving Rates

By R. PHILLIPS, M.Sc., A.R.I.C.
Department of Animal Health, University College of Wales, Aberystwyth

SINCE December, 1939, the Ministry of Agriculture and Fisheries has obtained quarterly returns of crops and livestock and other items of agricultural importance. These returns refer to the four quarter days of March 4, June 4, September 4 and December 4 in each year, and they provide very valuable information on many aspects of agriculture in this country.

The quarterly returns are available also for each county and from the county records it has been possible to estimate the calving rates of heifers and also the approximate overall extent of the herd replacement.

It must be realised that all the in-calf heifers entered in the agricultural quarterly returns do not of necessity enter the milking and breeding herds in their respective counties as no doubt a certain small proportion are later found to be not in-calf, whilst others may become casualties. In addition, a proportion are sold before they calve or immediately after calving and may enter the herds in other counties in Wales, or are exported into England. The full extent of this export trade in in-calf heifers is unknown but, as will be shown later, it can be only a relatively small proportion of the recorded in-calf heifers.

The quarterly records show that there are very marked differences between the various counties in Wales (including Monmouthshire), and the two counties of Caernarvon and Carmarthen may be cited to illustrate the varying proportions during the four quarter days. Table I refers to the average figures for the two years December, 1942, to September, 1944, the December figure being given as 100 in each case.

TABLE I

Relative numbers of in-calf heifers for two years 1943-44, with the December figures given as 100 in each case

County	December 4	March 4	June 4	September 4
Carmarthen	100	95	62.3	75
Caernarvon	100	168	183	157

It is seen that whereas Carmarthen has the lowest numbers on June 4 and the highest in December, Caernarvon on the other hand has its highest numbers in June and the lowest in December. It may be argued that the lowest figures are due either to a high proportion of sales of drafts or to a high proportion of calvings or to both factors. There is no doubt, however, that the main influence

is the relative seasonal rate of calving of heifers, which is high in spring in Carmarthen and high in autumn in Caernarvon.

Analyses of the records on the above basis do not provide any information on the annual totals nor on the seasonal proportions of calvings. A method employed by Smith (1946) has therefore been modified to obtain further information on the seasonality of the calving of in-calf heifers in the counties of Wales. The calculations employed in the estimation of the quarterly calving rates are given in Part 3 of this series.

It has been possible by this method to estimate the annual and quarterly calvings for each county in Wales, and although the figures are only approximate to within 1 to 2 per cent, yet they serve to show the trends during recent years as well as the differences between the counties in the seasonality of the calvings.

As may be seen in the appendix, all the Welsh counties show an annual increase in numbers of in-calf heifers from December, 1939, to September, 1944. The percentage increase is least in Radnorshire and Breconshire, with an average of less than 20 per cent for the last four years, whilst the highest increase is found in Anglesey, Monmouth, Cardigan and Pembroke, with an average increase of over 50 per cent in the annual numbers of in-calf heifers, and for the whole of Wales the comparable figure is 37 per cent increase.

This increase in the annual total number of in-calf heifers corresponds to the general increase in the milking and breeding herds and to the development and expansion of dairy farming which received a particular stimulus in the Welsh counties during the war years. The estimated total annual numbers of in-calf heifers for all the Welsh counties increased from 69,000 in 1939-40 to 101,500 in 1945-46, followed by a drop to 93,600 the following year. If Smith's (1946) estimate that 95 per cent of the recorded in-calf heifers entered the national herd be accepted, then the annual intake during the war years for the whole of Wales has grown in numbers as illustrated in Table II.

TABLE II

Estimated annual numbers of in-calf heifers entering the Welsh herds and a comparison with 1939-40 at 100 (reckoning on 95 per cent of the calculated totals)

	1939-1940	1940-1941	1941-1942	1942-1943	1943-1944	1944-1945	1945-1946	1946-1947	Mean 1943-47
95% actual calculated number	65,700	68,200	84,000	92,600	89,700	87,400	96,500	89,000	90,200
Comparisons	100.0	103.5	127.5	140.5	136.0	133.0	147.0	135.0	137.0

The first figure (1939-40) at 65,700 is fairly close to Ashby and Evans's (1944) estimate for the period 1935-37, when the annual intake of heifers into the herds in all the Welsh counties was reckoned to be about 60,000. By the end of the period under review (i.e. 1946-47) there were annually about four heifers in calf for every three at the beginning (i.e. 1939-40).

Seasonal Distribution of the Calvings of In-Calf Heifers

(a) *Wales (including Monmouthshire)*

It is well known that milk yields are influenced by the month of calving, and it is recognised that autumn calvers have a greater opportunity of attaining their maximum yields provided the winter feeding and management is satisfactory. In order to produce a high proportion of winter milk it is essential to arrange for a high proportion of autumn and early winter calvers. During the war period, when winter milk had a very high priority and when price levels and propaganda were directed towards its production, farmers were constantly urged to arrange the calvings of their herds so as to obtain a high proportion of autumn and early winter calvers. This could best be secured by arranging for the heifers to calve down for the first time during the autumn months. It is possible from the calculations of the quarterly returns to discover the extent of the success of the Welsh farmers' effort in this direction during the war period and subsequent years.

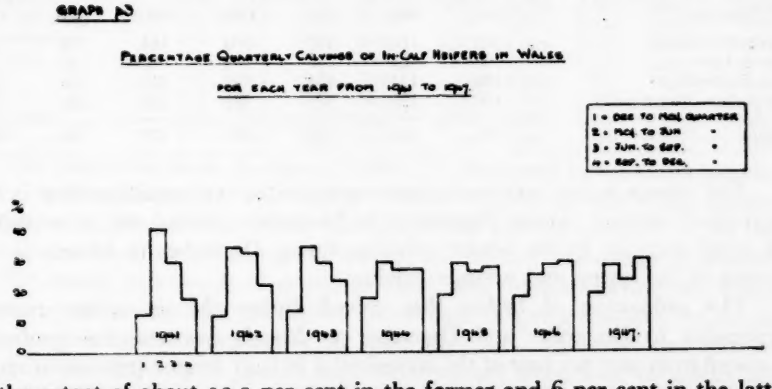
Table III gives the percentage of in-calf heifers calving each quarter for the years 1941-47.

TABLE III

Estimated quarterly percentage calvings of in-calf heifers in the herds in Wales for each year 1941-47, together with the total numbers

Months	1941	1942	1943	1944	1945	1946	1947
December-March ...	12.7	12.1	13.3	17.5	18.3	17.8	18.8
March-June	40.3	33.9	34.2	29.0	28.4	24.9	27.8
June-September ...	29.4	32.3	29.1	26.5	26.1	28.2	23.1
September-December ...	17.5	21.7	23.2	26.7	27.1	29.0	30.2
Total numbers	71,864	88,439	97,602	94,326	91,960	101,521	93,594

Table III and the accompanying graph show that there has been a regular and gradual improvement from year to year in the proportion of heifers calving during the two periods September to December and also December to March,



to the extent of about 12.5 per cent in the former and 6 per cent in the latter. The summer calvings, March to June and June to September, have declined, the former by about 12.5 per cent and the latter by 6 per cent. In other words,

the major changes have been a 12.5 per cent reduction in spring calvers and an increase in the percentage of autumn calvers by the same amount. The quarterly proportions are much closer together from 1944 to 1947 than they were previously and indicate that the calving programme had tended to become stabilised during 1944 to 1947. In view of the increases in the numbers of heifers calving each year, the differences are much more pronounced in the annual totals than in the quarterly proportions (see Table IV).

TABLE IV

The quarterly numbers of heifers calving down each year (Wales)

Period	1941	1942	1943	1944	1945	1946	1947
December-March ...	9,152	10,697	13,001	16,480	16,896	18,128	17,638
March-June	28,995	29,947	33,466	27,247	26,158	25,286	26,024
June-September ...	21,184	28,586	28,395	25,039	23,964	28,637	21,611
September-December ...	12,533	19,209	22,740	25,560	24,942	29,470	28,321
Total numbers	71,864	88,439	97,602	94,326	91,960	101,521	93,594

Table IV shows that whereas the numbers of heifers that calved during spring and summer (March to June quarter and June to September quarter) have remained fairly constant throughout the period, the numbers calving during the winter periods (i.e. September to December quarter and December to March quarter) have approximately doubled, increasing from 21,685 in 1941 to 45,959 in 1947. This increase in winter calvings must have had a marked influence upon the volume of winter milk produced (Milk Marketing Board data).

How these changes have been made may be partly explained by a study of Table V, which lists the comparative quarterly figures, those for 1941 being given as 100 in each case.

TABLE V

Comparison of the quarterly numbers of calving heifers, with 1941 as 100 in each case

Quarters	1941	1942	1943	1944	1945	1946	1947
December-March	100	118	142	180	184	198	193
March-June	100	103	115	94	90	87	89
June-September	100	133	132	118	113	134	102
September-December ...	100	153	181	204	199	235	226
Annual	100	123	135	131	127	141	130

The change is thus seen to be due mainly to the very rapid increase in the numbers of autumn calvers (September to December quarter) and to a slightly less rapid increase in the winter calvings during December to March at the expense of the spring and summer calvings.

The proportion of heifers that calved during the six winter months (September to December and December to March quarters) has gradually increased from 30.1 per cent of the annual total in 1941 to 49.1 per cent in 1947.

(b) *Individual Welsh counties (including Monmouthshire)*

Amongst the Welsh counties Carmarthen has the highest number of in-calf

heifers with approximately 16,000 per annum; Denbigh with 11,000 follows next, whilst Radnor has the lowest numbers with about 2,000 per annum.

The seasonal distribution of calvings of in-calf heifers in the Welsh counties shows wide variations, yet the regularity of the estimated figures, together with the confirmation that they give to seasonal distribution of calf and milk sales (Phillips and Davies, 1949), suggests that there are fundamental differences between the various counties in the seasonality of the calvings of heifers. (The full details of the calculated figures and the percentages for each of the Welsh counties are given in the appendix.)

In the following discussion it has been assumed that whatever the changes that have occurred in Welsh farming and dairy husbandry as a result of the war, these had become more or less established by 1944 (see Table III). Consequently, the average figures for the four years 1943-47 have been taken to compare the seasonality of the calvings between the different Welsh counties. The four-year average numbers as well as the quarterly percentages are given in Table VI. The counties are arranged in order from the highest to the lowest percentages of calvings during September to December.

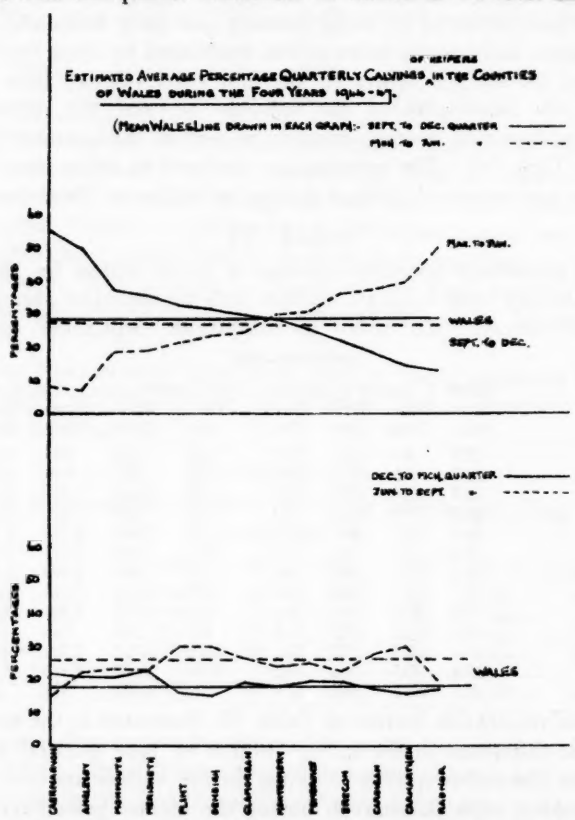
TABLE VI

The average percentage quarterly calvings of in-calf heifers for all the Welsh counties for the four years 1944-47, together with the respective average quarterly numbers per county. (In order of magnitude, September to December percentages)

Counties	Mean % quarterly calvings				Mean numbers quarterly calvings				Total
	Dec.-Mar.	Mar.-June	June-Sep.	Sep.-Dec.	Dec.-Mar.	Mar.-June	June-Sep.	Sep.-Dec.	
Caernarvon	22.1	8.0	15.3	54.7	1,432	516	993	3,542	6,483
Anglesey	20.7	7.2	22.5	49.6	857	297	934	2,057	4,145
Monmouth	20.8	18.6	23.7	36.9	1,367	1,220	1,557	2,415	6,559
Merioneth	22.8	19.0	22.8	35.4	655	547	655	1,011	2,868
Flint	16.1	21.3	30.0	32.6	1,224	1,634	2,292	2,502	7,652
Denbigh	15.0	23.5	30.2	31.3	1,654	2,583	3,313	3,434	10,984
Glamorgan	19.3	24.3	26.9	29.5	1,505	1,893	2,093	2,298	7,789
Montgomery ...	18.1	29.3	24.2	28.0	1,659	2,684	2,218	2,589	9,150
Pembroke	19.6	30.7	24.9	24.8	1,864	2,923	2,364	2,362	9,513
Brecon	19.6	36.2	22.7	21.6	831	1,537	963	917	4,248
Cardigan	17.1	37.3	27.7	18.1	1,282	2,795	2,082	1,360	7,519
Carmarthen	15.8	39.7	30.1	14.3	2,602	6,529	4,948	2,323	16,402
Radnor	17.5	50.1	19.5	12.9	355	1,021	398	262	2,036

The most remarkable feature of Table VI, illustrated in the accompanying graphs, is the difference in the spring (March to June quarter) and autumn (September to December quarter) calvings in the various counties. The two graphs cross over, with Caernarvon having the highest percentage of autumn and the lowest percentage of spring calvings, and Radnor having the lowest percentage of autumn and the highest percentage of spring calvings, whilst the other counties follow in practically the same sequence. The other two quarters (December to March and June to September) do not show wide variations and in many aspects the series remain parallel, with the June to September percentages at a higher level than December to March throughout, except in the case of Caernarvon.

It appears, therefore, that calvings that occur during the two quarters, December to March and June to September, are similar throughout and can therefore be looked upon as being directly controlled by the stock-owner. Services for these two periods would occur during the two quarters, March to June and September to December, both of which are periods when œstrus develops normally in bulling heifers. It is equally true that calvings during the period March to June, which imply services during the quarter June to September, are probably the easiest of all to arrange, since heifers may be expected to stand to the bull during this service period. On the other hand, it is realised that the quarter December to March is the most difficult one in



which to bring heifers to "heat," whilst the duration of the heat period at this season is the shortest during the whole year (Laing, 1947). This service time coincides with calvings during the September to December quarter.

There is a wide variation in the percentage autumn calvings of in-calf heifers between the different Welsh counties, with Caernarvon and Anglesey attaining the highest percentage at 50 and over, whilst Carmarthenshire and Radnorshire the lowest percentages at below 15 and the other counties

practically always occupying the same relative positions. The following alternative suggestions might be put forward to account for the differences between the different counties:—

(a) That the arrangement of the time of calvings in heifers is always directly controlled by the stock-owner and that the husbandry system in practice in Carmarthenshire must therefore demand a high rate of spring calvers in heifers, whilst that in Caernarvon and Anglesey demands autumn calvers;

(b) That sales of in-calf heifers or down-calving heifers is of such a magnitude at different times of the year in the various counties as to make the above-calculated calving figures meaningless;

(c) That winter œstrus in cattle is influenced by climatic conditions largely beyond the control of the average farmer: this would appear to be the most likely reason and it confirms previous evidence on milk production and calf sales by Phillips and Davies (1949), who showed that the western peninsulas of both North and South Wales had a higher winter production than the more inland areas.

As will be shown in Part II, the seasonal export sales of in-calf heifers cannot be very large, otherwise the herd replacement figures become meaningless. It is, however, known that winter œstrus in cattle is not under the complete control of the husbandman or stock-owner and that it is influenced by climatic and other factors.

It is difficult to assess the climatic influences on winter œstrus in cattle. It may be direct through sunshine or temperature, or else it may be due to variation in the nutritive value of fodders grown and harvested under different climatic conditions.

Most of the Welsh counties have, of course, been able to increase the autumn calving rate in heifers during the period under review, and the extent of this is seen in Table VII, which gives for each year the percentage of the calvings of heifers during the critical quarter, September to December.

TABLE VII

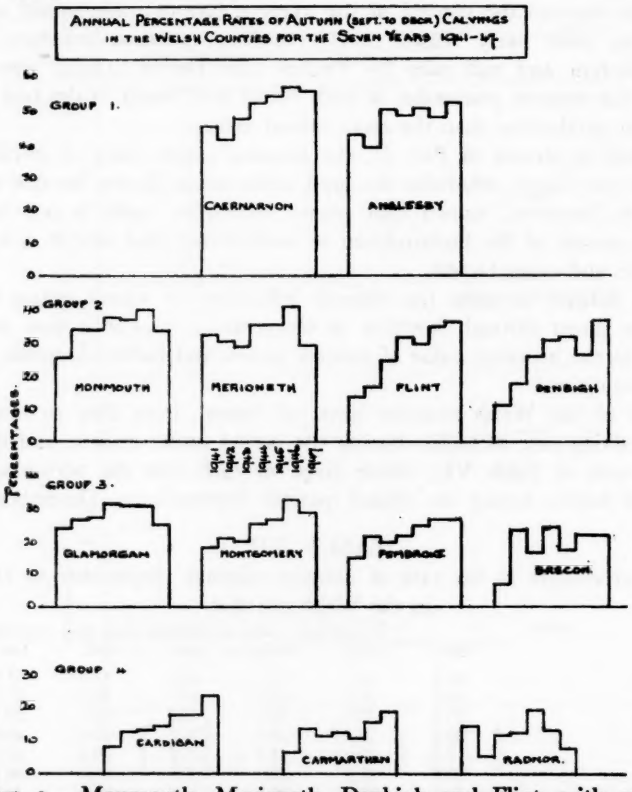
Annual percentages in the rate of autumn calvings (September to December) in the Welsh counties

County	Percentage calvings during Sep.-Dec. quarter						
	1941	1942	1943	1944	1945	1946	1947
Caernarvon	45.1	41.2	47.5	52.1	54.0	57.0	55.5
Anglesey	42.6	38.7	49.8	48.3	50.3	47.7	52.0
Monmouth	25.1	33.5	33.4	37.0	36.5	39.4	33.2
Merioneth	32.0	30.3	28.5	34.8	35.2	40.8	28.8
Flint	13.2	16.2	24.2	31.2	29.2	34.0	36.1
Denbigh	10.6	17.3	25.4	30.5	31.5	26.1	36.6
Glamorgan	24.0	26.3	26.9	31.0	30.6	30.7	25.1
Montgomery	18.1	20.9	19.7	25.1	26.5	32.3	28.4
Pembroke	15.0	21.6	19.4	21.6	24.4	26.4	26.5
Brecon	7.0	23.3	16.5	24.6	17.6	22.0	21.9
Cardigan	7.9	12.4	13.1	14.0	17.3	17.6	23.7
Carmarthen	7.3	13.4	11.1	12.2	10.6	15.2	18.7
Radnor	14.2	6.0	11.7	12.1	19.1	12.8	7.2
Wales	17.5	21.7	23.2	26.7	27.1	29.0	30.2

The general trends which the above figures serve to illustrate are obvious, with the order of the counties showing a fairly close agreement from year to year. Apart from Radnorshire, and to some extent Brecon, where the annual percentages are less regular, all the other counties show a fairly definite annual improvement. It appears that the improvement in the autumn percentages from 1941 to 1947 are approximately 10 per cent for most counties, but Denbigh and Flint show a 20 per cent increase. The extent of the improvement in the autumn calving percentages is also illustrated in the following graph.

From the four-year averages in Table VII, it now appears that the Welsh counties may be conveniently grouped as follows:—

Group 1.—Caernarvon and Anglesey, with an average rate of autumn calving of 50 per cent and over.



Group 2.—Monmouth, Merioneth, Denbigh and Flint, with an average rate of autumn calving of 30 to 40 per cent.

Group 3.—Glamorgan, Montgomery, Pembroke and Brecon, with an average rate of autumn calving of 20 to 30 per cent.

Group 4.—Cardigan, Carmarthen and Radnor, with an average rate of autumn calving of less than 20 per cent.

These groupings are shown in the map.

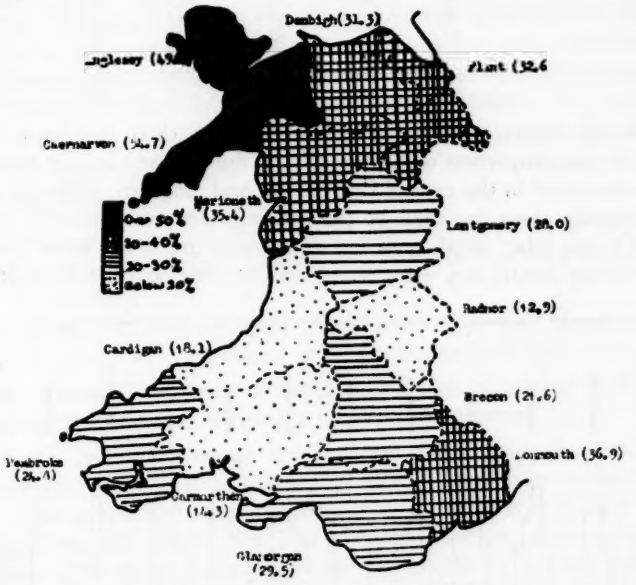
The improvement in the rate of autumn calvings of heifers can also be illustrated by a comparison of the increases in the annual and in autumn numbers (September to December quarter) for the three counties, Caernarvon, Denbigh and Carmarthen (Table VIII).

TABLE VIII

In-calf heifers: comparison of increases. Annual and autumn numbers for three counties

	Annual numbers				Autumn numbers			
County	1941	1944-1947	1941	1944-1947	1941	1944-1947	1941	1944-1947
Caernarvon	4,810	6,483	100	132	2,187	3,592	100	164
Denbigh	9,138	10,984	100	120	827	3,434	100	415
Carmarthen	12,739	16,402	100	128	935	2,323	100	248

The increases in annual numbers do not show marked percentage differences between the three counties during the period, but the differences between individual counties are very pronounced in the autumn percentages.



AUTUMN CALVING OF HEIFERS

Average percentages for [illegible] = 27 i.e. for [illegible]

Caernarvon, with the lowest annual numbers, has the highest number of autumn calvers, while Carmarthen, with the highest annual number of in-calf heifers, has the lowest number of autumn calvers. The other counties behave in a similar way, and occupy intermediate positions between the two extremes.

There would appear to be fundamental differences in this aspect of

animal husbandry in the different Welsh counties and it is, of course, necessary to understand the underlying principles in order to be able to correct obvious weaknesses in the systems now practised.

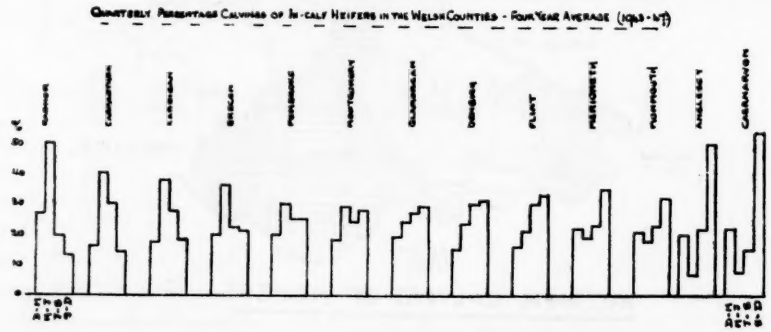
Another interesting annual comparison is obtained by taking the total summer calvings (March to September) for each county as follows (Table IX):

TABLE IX

Comparison of estimated percentage calvings in heifers during the summer months (March to September). Counties arranged as in previous order

	Percentage Summer Calvings						
Counties	1941	1942	1943	1944	1945	1946	1947
Caernarvon	41.6	57.7	41.0	28.7	21.2	22.4	20.9
Anglesey	48.2	50.8	38.1	35.6	34.8	35.4	23.3
Monmouth	58.6	41.4	52.2	41.6	42.2	40.2	45.4
Merioneth	58.6	54.4	56.0	42.6	43.4	35.0	47.8
Flint	75.7	73.3	62.9	55.8	52.9	50.6	46.3
Denbigh	92.4	74.5	62.5	57.4	52.2	60.2	45.4
Glamorgan	55.5	61.6	60.0	50.3	48.5	48.7	58.0
Montgomery	60.7	66.6	69.1	59.3	53.1	46.7	56.2
Pembroke	68.6	64.4	67.4	56.4	57.1	55.6	53.0
Brecon	83.2	55.7	68.8	51.3	66.1	60.5	58.3
Cardigan	84.1	72.7	72.7	67.5	66.5	65.8	59.1
Carmarthen	78.8	74.2	74.0	71.9	76.3	68.2	62.8
Radnor	67.8	88.9	72.5	69.8	57.4	72.9	79.6

Table IX shows that during the seven years there has been a gradual reduction in the proportion of heifers calving during the summer months. This is most pronounced in the case of Caernarvon and Anglesey, although a number of other counties show less than 50 per cent summer calvings at the end of the period. On the other hand, 5 of the 13 counties are never below 50 per cent summer calving during any year, whilst another four counties are below 50 per



cent on the one occasion only. Popular husbandry traditions advance the suggestion that spring and summer first calving of heifers has many advantages over autumn and winter calvings. To-day this is a doubtful policy because of the advantages to be derived from the autumn calving of heifers, more particularly on dairy farms. The summer percentages in the case of the National Herd (Great Britain) as shown by Smith (1946) has declined from 59.7 per cent

in the peak year 1941-42 to 33.3 per cent in the last year quoted, 1945-46. Smith shows also that there has been a considerable improvement in the percentages during the quarter September to December in which they are at a higher level than the estimated figure for Wales (shown in the Appendix). These data are brought together in Table X.

TABLE X

Annual percentages of the heifers calving in the autumn quarter (September to December) for Great Britain (Smith) and Wales

Years	Great Britain*	Wales
1939-40	28.4	—
1940-41	26.3	17.5
1941-42	28.2	21.7
1942-43	38.0	23.2
1943-44	35.7	26.7
1944-45	35.3	27.1
1945-46	39.0	29.0
1946-47	—	30.2

* Data from J. H. Smith—"The Farm Economist." Vol. 5. April-June, 1946.

Table X shows that there has been a definite improvement during recent years in the proportion of heifers calving down for herd replacement in the autumn months, but it is apparent that the extent of autumn calvings is exceedingly variable and this may be due to a variety of causes.

The following two series of graphs illustrate certain differences in the percentage quarterly calvings of in-calf heifers in the various Welsh counties during the period under review.

Series 1. The average four-year graphs (1943-47). This series shows the average percentage quarterly calvings in heifers for the four years for each of the Welsh counties.

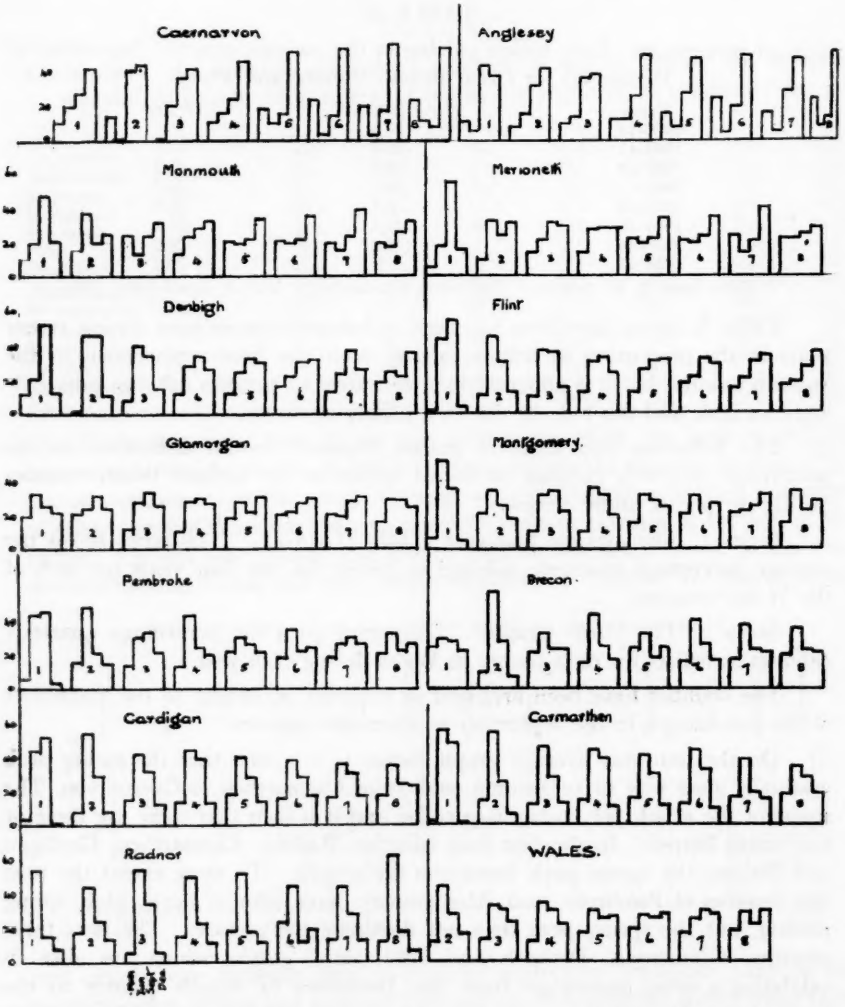
Series 2. The yearly graphs. This series gives the percentage quarterly calvings in heifers for each county in Wales during each year.

The counties have been arranged in sequence according to the magnitude of the percentages in the September to December quarter.

On the four-year average graph, Series 1, it is seen that the spring peak gradually gives way to an autumn peak from Carmarthen to Caernarvon. The shape of the graph per county is peculiar and it is seen that there are three or four main shapes. In the first four counties, Radnor, Carmarthen, Cardigan and Brecon, the spring peak dominates the graphs. To some extent the next two counties of Pembroke and Montgomery have also a fairly high spring calving, but the spring peak does not dominate the picture. The next three counties, Glamorgan, Denbigh and Flint, show graphs which are alike in exhibiting a rising percentage from the December to March quarter to the September to December quarter; these "staircase" graphs have a higher autumn percentage than in any other quarter. The four remaining counties of Merioneth, Monmouth, Anglesey and Caernarvon all exhibit what may be described as a "groove and tongue" graph in which the percentages in the spring quarter (March to June) become gradually depressed and while the autumn peak shows

definite increments from Merioneth to Caernarvon, the other two quarters remain remarkably steady and unchanged in these four graphs.

The four year average graphs, Series 1, show that the Welsh counties can be arranged in sequence in accordance with the shape of the graph, ranging



from a high spring peak in some counties to a high autumn peak in others. The four year average graph for Wales resembles more that of Montgomeryshire than any other county. The variations in shape within Wales implies that there may be equal or even greater differences between districts within each county

and it is only a more detailed zonal examination that will give the complete picture.

The yearly graphs, Series 2, are made for each year, the first being December, 1939 to September, 1940, and the graphs are all drawn on a percentage basis. In following these quarterly graphs it is seen that they all show changes in shape from year to year. Caernarvon, for example, shows a "staircase" graph in the three years 1940, 1942 and 1943, which then changes to a pronounced "groove and tongue" graph. Anglesey is very similar to the Caernarvon sequences. Denbigh and Flint do not attain the "staircase" graph until the third or fourth years after which there is an attempt to develop the "groove and tongue" type. The next two counties of Glamorgan and Montgomery do not develop the "staircase". graph until the sixth and seventh year and then attempt to proceed to the "groove and tongue."

The remaining counties Pembroke, Cardigan, Carmarthen and Radnor do not attain the "staircase" graph in any year and although they tend to modify the spring peak, yet they are quite unable to develop into the "groove and tongue" type of graph.

These differential annual sequences in the shapes of the graphs indicate a fairly definite change in time, and the order of this change is always the same. There appears from the four year graphs, Series 1, and from the yearly graphs, Series 2, to be an indication of the phenomenon of a parallel sequence in time and space. There is also the indication that to attain the desirable "groove and tongue" graph (whilst winter milk remains a priority) it is necessary to proceed from a spring peak in a definite sequence of quarterly percentages. The Montgomery annual series of graphs may be a typical example of the order in which this change can and must be effected.

What exactly underlies these sequences is at present unknown and before further information can be obtained it will be necessary to examine the returns in terms of smaller areas than counties, which in Wales are nothing more than a mixture of upland and lowland, dairying and store rearing areas. The units that need to be examined are zones of similar elevation, climate, soil and fertility, system of farming and all other factors that go to make a farming countryside.

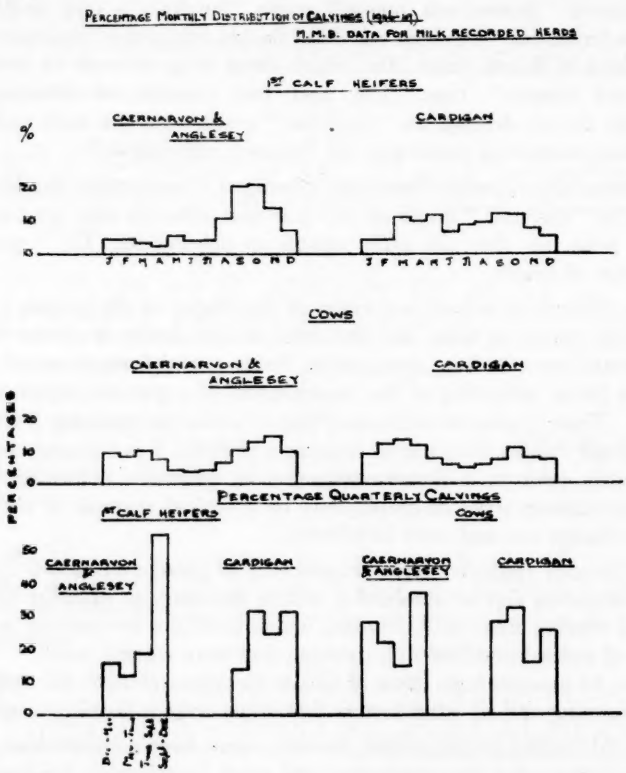
Even the county yearly graphs, Series 2, must have a significance, but it is not easy to judge what they represent until zonal examination has been carried out. It has taken Carmarthen much longer than Caernarvon to attain the desirable quarterly percentages, but it is obvious from the Carmarthen graphs that farmers in that county have made some effort to change the quarterly rates of calving and have improved on the autumn percentages.

In the yearly graph, Series 2, for Wales as a whole, the spring peak in the second year gradually loses its dominating position, and although there is no definite "staircase" graph (No. 7 being the nearest in its approach) there is, however, quite a definite "groove and tongue" shape in the eighth year.

The figures given above are of course estimates caculated from the Ministry's returns and cannot give a complete and correct answer. It is true that

husbandry control is of profound significance, but the influence of factors such as fertility, abortion, draft sales of in-calf heifers, the increase in cow population affecting both intake and culling in herds, are also important considerations, but when all those internal farm factors are assessed there still remains the external influence of the climatic conditions which affects winter œstrus in cattle.

Confirmation is obtained also from the records of milk-recorded herds



(National Milk Records) in which the monthly distribution of the calvings of heifers and of cows is given below as a percentage of the annual totals.

The calving distribution in the two sample branches are quite different.

The table shows a much higher autumn peak in Anglesey and Caernarvon in both the cows and the heifers. This comes out more clearly by expressing the above percentages on a quarterly basis, as follows (Table XII).

The estimated county figures (Table IV, p. 354) and the milk records data are very similar in the case of heifers. They confirm, as do the data for " cows," the fact that whereas North Wales is a region of high autumn calvings, West Wales is one of high spring calvings.

TABLE XI

Percentage monthly distribution of calving in milk recorded herds based on 1946/47 lactation records for the two branches Anglesey and Caernarvon and Cardigan (M.M.B. data)

	First Calf Heifers		Cows	
	Anglesey and Caernarvon	Cardigan	Anglesey and Caernarvon	Cardigan
October	20.6	11.7	12.3	10.3
November	13.6	7.5	14.5	7.6
December	6.9	5.3	9.5	7.3
January	4.4	4.0	9.4	8.9
February	4.3	4.2	8.5	11.5
March	3.5	10.2	9.8	13.1
April	2.5	9.6	7.6	11.3
May	5.5	11.3	4.1	7.7
June	4.1	6.6	3.9	5.2
July	4.1	8.5	4.1	4.7
August	10.3	9.3	6.5	5.4
September	20.2	11.8	9.8	7.0
No. of lactation exams.	766	1020	1446	3168

TABLE XII

Percentage quarterly distribution of calving in milk recorded herds (M.M.B. data). (The percentages from Table VI are in brackets)

	First Calf Heifers		Cows	
	Anglesey and Caernarvon	Cardigan	Anglesey and Caernarvon	Cardigan
September, October, November	(52.6) 54.4	31.0 (18.1)	36.6	24.9
December, January, February	(21.7) 15.6	13.5 (17.1)	27.4	27.7
March, April, May	(7.4) 11.5	31.1 (37.3)	21.5	32.1
June, July, August	(18.3) 18.5	24.4 (27.7)	14.5	15.3

It is remarkable that the figures coincide so well, and it could be construed that nowadays the milk records data give a fairly accurate calving picture of the county herds.

The graphs illustrate the above tables.

Dry Cows

Confirmation of the information on the differential rates of calving of heifers in the Welsh counties during the four quarters of the year is obtained from the examination of the quarterly returns of the Ministry in regard to the dairy and breeding herds. If the " cows in calf and not in milk " are taken as a percentage of the dairy and breeding herd (i.e. cows and heifers in milk plus cows in calf and not in milk) for all the quarter days, it is seen that there is a considerable difference between the counties, corresponding in many respects to the " in-calf heifer " quarterly percentage calvings already discussed.

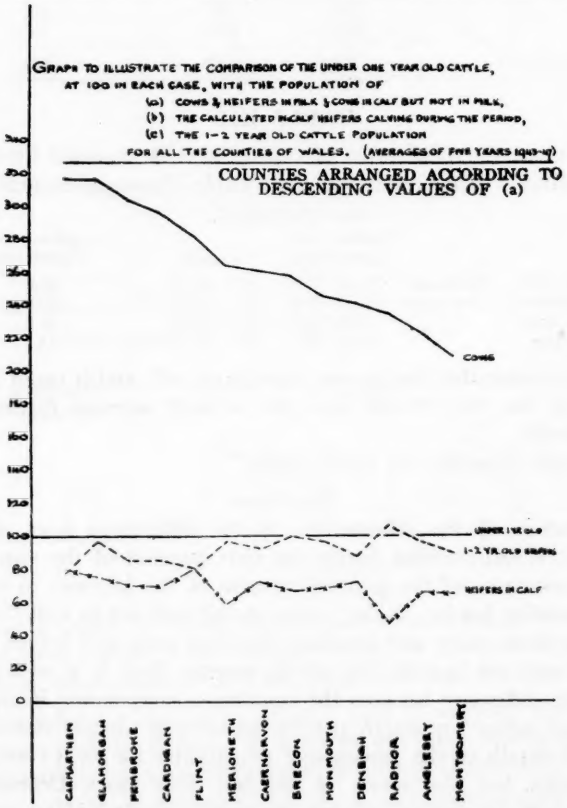
The full details of the percentages per quarter for each county are given in the appendix, but the mean of the last four years December, 1943—September, 1947, are given in the following table (Table XIII).

TABLE XIII

Average percentage of " cows in calf but not in milk " in the total dairy and breeding herds in the Welsh counties for each of the four quarter days and

for the four years 1944-47 (calculated from the quarterly returns of the Ministry). (Counties arranged in the same order as in Table VII)

County	December	March	June	September
Caernarvon	23.4	20.2	16.8	27.2
Anglesey	24.5	24.2	14.7	23.3
Monmouth	34.5	30.5	21.7	27.6
Merioneth	28.4	22.4	18.2	20.4
Flint	35.0	29.6	16.2	23.9
Denbigh	33.9	30.9	16.2	22.6
Glamorgan	34.1	31.1	22.4	28.3
Montgomery	39.7	38.0	19.2	25.8
Pembroke	34.5	32.5	17.3	25.8
Brecon	51.0	50.5	20.8	22.5
Cardigan	37.2	39.2	15.8	20.0
Carmarthen	41.0	39.8	18.0	22.0
Radnor	52.2	54.7	18.0	17.5
Wales	36.3	34.7	18.0	23.9



The table is illustrated in Graph A which shows that there are less inter-county variations during the summer period (June and September returns) than for the two winter quarter days December to March.

The lines of the winter percentages of December and March, however, run very close together and show a regular increase which is reminiscent of the increase in the percentage of spring calvings in heifers in the Welsh counties.

Graph B has been constructed in order to bring together the December percentage of dry cows from Graph A and the calvings of in-calf heifers during the spring quarter March to June. Apart from Brecon the two lines show the same tendencies, indicating that it is possible to continue year after year with a high rate of autumn calving of cows in counties where there is a high rate of autumn calving of heifers. Thus, counties with a high proportion of dry cows in winter have a high rate of spring calvings in heifers, whilst a low proportion of dry cows in winter coincides with a high rate of autumn calvings and a low rate of spring calvings in the heifers.

The June percentages are lowest of the four series (Graph A). Anglesey has the lowest mean percentage dry cows in June at 14.7 per cent, whilst Brecon, Glamorgan and Monmouth each have over 20 per cent. The September figures are always higher than the June figures (except in Radnor with practically the same figure and the lowest of all the counties) when inter-county differences are at the minimum.

During the eight years under review there is a slight rise (gradually attained) in the percentage dry cows per quarter day per county. (See Appendix for full percentages) amounting to between five and ten per cent.

The percentage figures for Merioneth and Pembroke are taken as examples to illustrate the changes that have taken place from 1940 to 1947 (Table XIV).

TABLE XIV

Percentage dry cows

County	Year	December	March	June	September
Merioneth	1940	22.4	31.3	14.0	12.0
	1947	30.0	33.1	18.6	19.7
Pembroke	1940	32.7	32.2	14.1	15.3
	1947	33.8	32.1	18.3	26.5

Practically all the counties show the same trends with smaller differences between the first and last year in Brecon and Radnor.

This apparent increase in percentage "dry" cows in all the quarters implies that cows are now dried off when the yield is below a certain minimum, whereas in previous days the cow was milked for the last drop. In other words there has been a general shortening of the lactation period and a lengthening of the dry period. This probably makes only a slight difference in the annual milk yield as a cow giving one quart daily for the last month of the lactation only adds $7\frac{1}{2}$ gallons to her lactation yield. Again, spring calvers have a very different lactation curve from that of autumn calvers and in general the duration of the lactation period is shorter and the dry period longer in the case of spring calvers. This is borne out in the case of counties with a high rate of spring calvers, e.g., Radnor, Cardigan, Brecon and Carmarthen, where there is always a high percentage of "dry" cows during the winter months.

Discussion

In order to test the significance of the observations and of the conclusions already made in regard to the differences in the seasonality of calvings in heifers in the Welsh counties it would be desirable to have the quarterly returns on a parish basis, or better still to obtain similar records for groups of farms lying within well-defined climatic zones. Unfortunately it is not possible to obtain this information at present.

It is realised that no single county in Wales provides anything approaching a perfect climatic zone, because within most of them there are often greater extremes than between adjoining ones.

Although the data on the basis of counties may lack precision in many ways, yet in view of the supporting evidence obtained in other directions (e.g., the seasonality of the milk and of the calf sales) there is no denying that the figures show definite trends in space and time. That more detailed evidence is desirable is seen in the comparisons of the Wales graph as a whole for quarterly calvings with the graphs of the separate counties. The Wales graph, which is an average of all the counties, fails to show the regional differences, although it gives indications of the differences in time. Similarly it may safely be assumed that the county graphs, which are averages of the zones within the county, fail to exhibit the differences between those zones and it is the fundamental differences between those zones that are important.

Summary

It is possible to calculate from the returns of the Ministry of Agriculture and Fisheries, the quarterly rates of calving of in-calf heifers.

It has been found that changes have taken place since 1940 in the seasonality of the rates of calving of heifers in Wales as a whole and in the Welsh counties, and there has been an improvement in percentages of the heifers calving during the quarter September to December in practically all the Welsh counties. Thus, in Caernarvonshire it is estimated that over 50 per cent of the heifers calve during the September to December quarter, whereas in Carmarthenshire only 15 per cent calve down in the same period (averages for four years 1944-47).

A grouping of the Welsh counties in accordance with their autumn calving rates is suggested.

From the milk and calf sale evidence already examined (Phillips and Davies, 1949), it is highly probable that some of the differences between the autumn calving rates are closely related to differences in climate, of which the hours of bright sunshine during the period of conception (December to March) are probably the most important.

The seasonality of the percentage "dry" cows indicates that where there is a high autumn rate of calving in heifers, there is a low rate of spring calving

in herds. There has been a marked increase in the annual numbers of in-calf heifers in the Welsh counties since 1940.

Attention is drawn to the desirability of arranging for the quarterly returns to be provided on a parish basis.

Acknowledgement

This investigation has formed part of the survey of animal health and production in West Wales and thanks are due to the scientific branch of Messrs. Cooper, McDougall & Robertson, Berkhamsted, for financial support. Grateful acknowledgement is made to the Milk Marketing Board, Thames Ditton, for readiness in providing data and helpful advice, to Professors E. G. Bowen and A. N. Worden, for their interest in the work, and to Mr. E. H. Brown, B.Sc., in connection with the maps.

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Award of Wellcome Fellowship for Veterinary Research

It is announced by the Animal Health Trust that a Wellcome Fellowship for Veterinary Research has been awarded to Mr. S. V. Boyden, B.Sc., M.R.C.V.S.

Mr. Boyden, who is a native of Surrey, lives at "Dunster," Tadorne Road, Tadworth, Surrey. He qualified from the Royal Veterinary College in 1947, was awarded a Research Training Scholarship of the Animal Health Trust, and proceeded to Jesus College, Cambridge. He spent his first year attending the Part II Classes in Pathology, and since then has been carrying out research under Professor Beveridge at the Institute of Animal Pathology. He has been studying the problem of bacterial hæmagglutination, and has obtained important results using mallein. With the Research Fellowship he hopes to continue his work, extending it to a number of germs, including bacteria and viruses, causing animal disease. This problem, which is a new one, and which is bringing to light many important facts in the realm of human pathology, should prove equally important in the further study of animal disease.

Publishers' Notices

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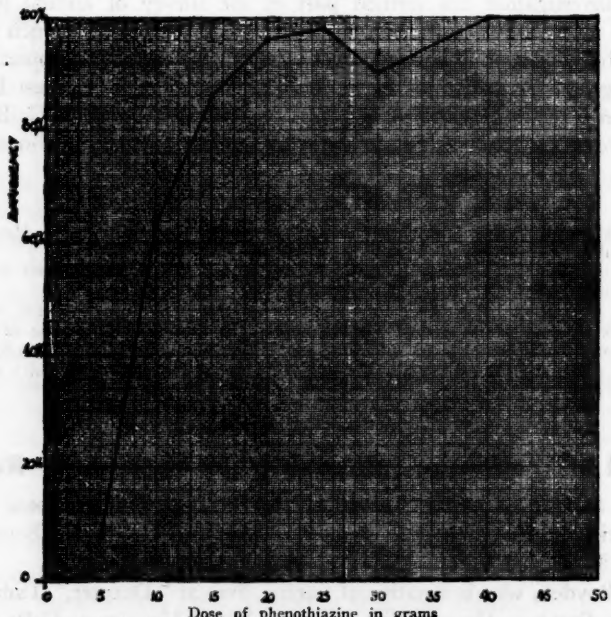
ADDENDUM

The Action of Phenothiazine on Pure Infestations of Trichostrongylus Axei in Sheep

By T. E. GIBSON

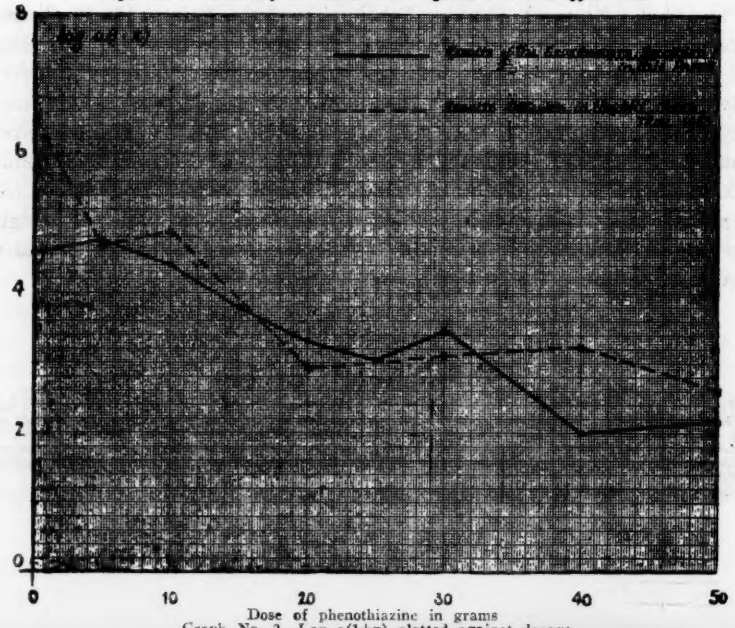
The above article, which appeared in the August, 1949, issue of this Journal, referred on page 310 to Graphs Nos. 1 and 2.

These were inadvertently left out of the article. We are therefore publishing the Graphs in this issue to enable our readers to follow the author's article correctly.



Dose of phenothiazine in grams

Graph No. 1.—Efficiency of Phenothiazine against *Trichostrongylus axei*



Dose of phenothiazine in grams

Graph No. 2.—Log a(1+x) plotted against dosage